

CLAIMS:

1. Software System, referred to as Image Transport Engine, for processing a sequence of images by deploying Image Processing Functions onto a multiprocessor system called Platform, said Platform generating input image data in order to provide processed output image data, said Software System comprising:

a software data partitioning model, referred to as Communication Pattern, which partitions the images of the sequence using time-stamped data packets, the transfer of which may overlap the execution of said image processing functions.

2. The Software System of Claim 1, wherein the Communication Pattern is formed of nodes linked by arcs; the nodes are Software Modules; the arcs are oriented Connections associated to the Modules through Ports; and each Module activates one Image Processing Function attached to it and manages data transfers and synchronization.

3. The Software system of Claim 2, wherein:
a Module exchanges information with an other Module through Ports;
among the Modules, there are one Source Module responsible to generate the time-stamped data packets and a time reference data structure labeled Time-Ref, which locates every image data packets of a given Image Sequence; one or several Sink Modules used as Output Data receptors; and Ordinary Modules connected between the Source Module and the Sink Modules in such a manner that the image data flows in one direction only and in an a-cyclic manner;

the Source Module has no Input Port and the Sink Modules have no Output Ports; the Ordinary Modules have Input and Output Ports.

4. The Software system of Claim 3, wherein, among the Connections, there are data Connections dealing with Data and specialized in the transfer of image data packets, which are one-way Connections.

5. The Software system of Claim 4, wherein the time reference data structure labeled Time-Ref locates data packets with respect to an image index in the image sequence and with respect to a data packet position within the current image.

6. The Software system of Claim 5, wherein the source Module partitions the Input Data into data packets that are data slices referred to as Image Strips, an Image Strip being a packet of consecutive image lines, parallel to the image lines, the data arriving along said lines formed of pixels that have to be processed; and Image Strips may overlap other Image Strips.

7. The Software system of Claim 7, comprising the definition of Overlapping Areas for the active area of the Image Strips, which are formed of extra parts of Image Strips located on either sides of said active area of the Image Strips.

8. The Software system of Claim 7 for programming a distributed application comprising steps of transmitting Image Strips with Overlapping areas between emitting Modules and receiving Modules, wherein steps of adjusting the difference between the instant of production of Image Strips by a Module and the instant of emission of the Image Strips by said Module, and steps of adjusting the difference between the instant of reception of Image Strips by a Module and the instant of processing of the Image Strips by said Module, for performing optimal overlapping between data transfer and data processing.

9. The Software system of one of Claims 6 to 8, wherein the time reference structure labeled Time-Ref locates the Image Strips with respect to the current image index in the sequence and with respect to the Image Strip position within the current image; and the Data Connections insure repeated transfers of successive Image Strips together with synchronization information including Time-Ref and all Modules repeatedly receive, process and transmit the Image Strips.

10. The Software System of one of Claims 2 to 9, wherein the Communication Pattern comprises one the following types of Connections between two Ports:

A Pipe-Line Connection that is a point to point Connection, which transfers consecutive Image Strips;

A $[1/n]$ -Scatter Connection that is a point to point Connection belonging to a group of n Connections all issued from a common Output Port, which transfers one Image Strip every n Image Strips;

5 A $[1/n]$ -Gather Connection that is a point to point Connection belonging to a group of n connections all reaching a common Input Port, which transfers one Image Strip one every n Image Strip and gathers all the Image Strips reaching this common Output Port.

11. The Software system of Claim 10, comprising method of task partitioning and/or method of data partitioning among which Task Partitioning Structures using Pipeline
10 Connections, wherein the Image Processing Functions are applied one after the other along the physical data path linking the involved Modules, each Module activating a given task for all the Image Strips.

12. The Software system of Claim 10, comprising method of task partitioning
15 and/or method of data partitioning among which Scatter/Gather type of Data Partitioning using a $[1/n]$ -Scatter Connection that distributes the Image Strips in n destination Modules, according to Image Strip-Indices with possible spatial shifts between Images Strips and time delay adjustments, and/or using a $[1/n]$ -Gather Connection that gathers n Image Strips in a destination Module according to their Image Strip indices.

20 13. The Software system of Claim 10, comprising Data Partitioning Structures using Pipeline Connections and a propriety of the Source Module that is to convey two synchronous output streams as if they were emanating from two distinct parts of images, and gathering said two parts of images within the Sink Image Processing function and push the
25 final result towards a targeted Terminal Port.

30 14. A medical examination imaging apparatus having means for acquiring medical digital image data and using a Software System having access to said medical digital image data according to one of the preceding Claims 1 to 13, and having display means for displaying the medical digital images and the processed medical digital images.

15. A computer program product comprising a set of instructions for running the Software System as claimed in one of Claims 1 to 13.